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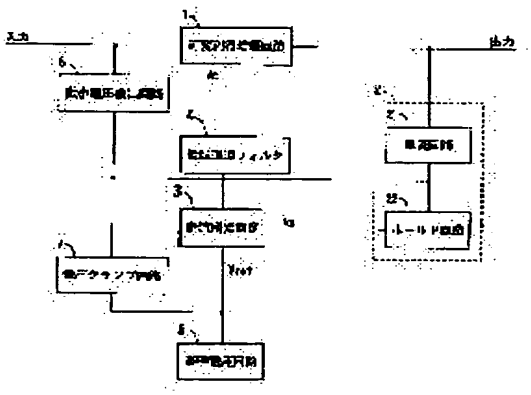
(54) AUTOMATIC GAIN CONTROLLER

(57)Abstract:
PURPOSE: To correct a lower limit gain to be constant at all times by varying a clamp voltage of a control voltage of the automatic gain controller in which a control characteristics of an AGC gain is revised by varying a reference voltage.
CONSTITUTION: A variable gain amplifier circuit 1 is controlled by a control voltage Vc whose high frequency component is eliminated. The control voltage Vc is obtained by a voltage resulting from an output voltage of the variable gain amplifier circuit 1 rectified through a rectifier circuit 21 or a voltage detected by a very small voltage detection circuit 8 which is higher and smoothed by a hold circuit 22 via a DC amplifier circuit 3. Since a clamp circuit 7 changes a clamp voltage of the control voltage Vc depending on a reference voltage of a reference voltage circuit 5, even when the AGC characteristics is revised by, changing the reference voltage, the lower limit gain is corrected to be constant at all times.



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CLAIMS

[Claim(s)]
[Claim 1] An adjustable gain amplifying circuit which responds to gain controlled by control voltage, and amplifies or decreases an input signal, A rectifier circuit which rectifies an output signal of this adjustable gain amplifying circuit, and a hold circuit which outputs peak voltage of rectification voltage rectified by this rectifier circuit, A reference voltage circuit which outputs reference voltage which changes based on foreign voltage, and a direct-current-amplification circuit which outputs said control voltage according to difference of said peak voltage and said reference voltage, Automatic-gain-control equipment characterized by having a change circuit which changes an output signal and said input signal of said adjustable gain amplifying circuit based on said reference voltage.
[Claim 2] Automatic-gain-control equipment according to claim 1 characterized by having further a low pass filter excluding a high frequency component of direct current voltage from said control voltage outputted by said direct-current-amplification circuit.
[Claim 3] An adjustable gain amplifying circuit which responds to gain controlled by control voltage, and amplifies or decreases an input signal, A rectifier circuit which rectifies an output signal of this adjustable gain amplifying circuit, and a low pass filter which outputs effective voltage of rectification voltage rectified by this rectifier circuit, A reference voltage circuit which outputs reference voltage which changes based on foreign voltage, and a direct-current-amplification circuit which outputs said control voltage according to difference of said effective voltage and said reference voltage, Automatic-gain-control equipment characterized by having a change circuit which changes an output signal and said input signal of said adjustable gain amplifying circuit based on said reference voltage.
[Claim 4] Automatic-gain-control equipment characterized by providing the following An adjustable gain amplifying circuit which responds to gain controlled by control voltage, and amplifies or decreases an input signal A rectifier circuit which rectifies an output signal of this adjustable gain amplifying circuit, and outputs the 1st rectification voltage A minute voltage detector which rectifies while making height of voltage of an input signal of said adjustable gain amplifying circuit into reverse, and outputs the 2nd rectification voltage A clamping circuit which controls the 2nd rectification voltage outputted from this minute voltage detector below to a predetermined value according to a value of said reference voltage, Of the 2nd rectification voltage which was outputted from the 1st rectification voltage and said minute voltage detector outputted from said rectifier circuit, and was controlled by said clamping circuit, either A hold circuit which outputs peak voltage of rectification voltage of the higher one, A reference voltage circuit which supplies suitable reference voltage, and a direct-current-amplification circuit which outputs said control voltage according to difference of peak voltage outputted from said hold circuit, and said reference voltage
[Claim 5] Automatic-gain-control equipment according to claim 4 characterized by having further a low pass filter excluding a high frequency component of direct current voltage from said control voltage outputted by said direct-current-amplification circuit.
[Claim 6] Said clamping circuit is automatic-gain-control equipment according to claim 4 or 5 characterized by having a direct-current-amplification circuit which amplifies said reference voltage.

[Claim 7] Automatic-gain-control equipment characterized by providing the following An adjustable gain amplifying circuit which responds to gain controlled by control voltage, and amplifies or decreases an input signal A rectifier circuit which rectifies an output signal of this adjustable gain amplifying circuit, and outputs the 1st rectification voltage A minute voltage detector which rectifies while making height of voltage of an input signal of said adjustable gain amplifying circuit into reverse, and outputs the 2nd rectification voltage A clamping circuit which controls the 2nd rectification voltage outputted from this minute voltage detector below to a predetermined value according to a value of said reference voltage, Of the 2nd rectification voltage which was outputted from the 1st rectification voltage and said minute voltage detector outputted from said rectifier circuit, and was controlled by said clamping circuit, either A low pass filter which outputs effective voltage of rectification voltage of the higher one, A reference voltage circuit which supplies suitable reference voltage, and a direct-current-amplification circuit which outputs said control voltage according to difference of effective voltage outputted from said low pass filter, and said reference voltage

[Claim 8] Said clamping circuit is automatic-gain-control equipment according to claim 7 characterized by having a direct-current-amplification circuit which amplifies said reference voltage.

[Claim 9] Automatic-gain-control equipment characterized by providing the following An adjustable gain amplifying circuit which responds to gain controlled by control voltage, and amplifies or decreases an input signal A change circuit which changes and outputs an input signal and an output signal of said adjustable gain amplifying circuit A rectifier circuit which rectifies an output signal of this change circuit A keying circuit which opens and closes rectification voltage rectified by this rectifier circuit, and a hold circuit which outputs peak voltage of said rectification voltage through this keying circuit, An analog-to-digital-conversion circuit which changes said peak voltage into a digital signal, A store circuit which memorizes output data of this analog-to-digital-conversion circuit, A direct-current-amplification circuit which outputs said control voltage according to difference of a digital to analog circuit which changes into an analog signal data by which reading appearance was carried out, and said peak voltage and output voltage of said digital to analog circuit from this store circuit

[Claim 10] Automatic-gain-control equipment according to claim 9 characterized by having further a charge circuit which charges output voltage of said digital to analog circuit in said hold circuit while said change circuit is outputting said input signal.

[Claim 11] Automatic-gain-control equipment according to claim 9 or 10 characterized by having further a low pass filter excluding a high frequency component of direct current voltage from said control voltage outputted by said direct-current-amplification circuit.

[Claim 12] Said store circuit is automatic-gain-control equipment given in any 1 term of claims 9-11 characterized by being nonvolatile memory.

[Claim 13] Said store circuit is automatic-gain-control equipment given in any 1 term of claims 9-11 characterized by consisting of a backup circuit for holding the contents of volatile memory and this volatile memory.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[The technical field to which invention belongs] This invention relates to the automatic-gain-control equipment which controls the gain of an adjustable gain amplifying circuit according to the amplitude of an input signal, and controls fluctuation of an input signal so that the amplitude of an output signal may become fixed in communication system or an audio system.

[0002]
[Description of the Prior Art] Hereafter, fluctuation of an input signal is controlled, and the conventional automatic-gain-control equipment which can take out a fixed output signal is explained, referring to a drawing.
[0003] Drawing 11 is the block diagram of conventional automatic-gain-control equipment. The adjustable gain amplifying circuit which amplifies input signal voltage in drawing 11 according to the gain by which 1 is controlled by control voltage, The peak detector which 2 detects the peak of the output voltage of the adjustable gain amplifying circuit 1, and is held, The rectifier circuit where 21 rectifies input signal voltage, the hold circuit holding the peak value of the rectification voltage on which 22 was rectified by the rectifier circuit 21, The direct-current-amplification circuit which outputs the voltage proportional to the difference of the voltage as which 3 was inputted, The low pass filter which 4 removes the high frequency component of the output voltage of the direct-current-amplification circuit 3, and outputs effective voltage, The resistance partial pressure circuit where 51 generates suitable reference voltage from the power supply potential Vcc, The 1st resistor by which R1 pressures the power supply potential Vcc partially, the 2nd resistor by which R2 pressures the power supply potential Vcc partially, The change buffer circuit with a control terminal which changes the condition that 61 does not pass with the condition that an input signal passes along the adjustable gain amplifying circuit 1, The input terminal with which, as for 61A, the direct input of the input signal is carried out, the input terminal into which, as for 61B, the output signal of the adjustable gain amplifying circuit 1 is inputted, The reference voltage to which Y is outputted by the output terminal of this automatic-gain-control equipment, and Vref is outputted by the resistance partial pressure circuit 51, The peak voltage to which Vx is outputted by the peak detector 2, the control voltage which Vc is generated by the direct-current-amplification circuit 3 by the difference of peak voltage Vx and reference voltage Vref, and a ripple component is removed by the low pass filter 4, and controls the adjustable gain amplifying circuit 1, Vcc is supply voltage which drives equipment.

[0004] Actuation of the automatic-gain-control equipment constituted as mentioned above is explained based on a drawing below.
[0005] Drawing 12 is drawing showing the AGC (= Automatic GainControl) property of conventional automatic-gain-control equipment. Drawing 12 (a) is the correlation diagram of the control voltage Vc of conventional automatic-gain-control equipment, and gain (=Gain). In drawing 12 (a), G0 is the maximum gain and G9 is the minimum gain.
[0006] Drawing 12 (b) is the correlation diagram of the peak voltage Vx of the direct-current-

amplification circuit at the time of fixing reference voltage, and control voltage Vc. In drawing 12 (b), the peak voltage from which Vx1 serves as 0dB gain in reference voltage Vr 1:00 shown in drawing 10 (a), and Vc1 are control voltage which sets gain of the adjustable gain amplifying circuit 1 to 0dB at peak voltage Vx 1:00.

[0007] Drawing 12 (c) is the correlation diagram which made voltage of the input signal of conventional automatic-gain-control equipment, and voltage of an output signal the pair numeric value. As for the minimum value which becomes effective [vin0 / AGC of input signal voltage], the input signal voltage from which vin1 becomes the 0dB gain in reference voltage Vr 1:00 shown in drawing 10 , the maximum which becomes effective [vin9 / AGC of input signal voltage], and G0, in drawing 12 (c), the maximum gain and G9 are the minimum gains. Gain falls as input signal voltage becomes large on the basis of vin1, and since gain goes up as input signal voltage becomes small, the amplitude of output signal voltage can be kept constant.

[0008] Furthermore, at the time of the control voltage Vc1 shown in drawing 12 (b), as shown in drawing 12 (c), gain is set to 0dB. If it is made to change from the reference voltage Vr1 of the standard which shows the reference voltage Vref inputted into the direct-current-amplification circuit 3 to drawing 10 (a) to the reference voltage Vr3 higher than a standard, in order to shift to the one where the peak voltage Vx1 for outputting control voltage Vc1 is higher than Vx1 of a standard, gain is set to 0dB by vin3 from vin1 of a standard also with higher input signal voltage. On the contrary, if it is made to change to the reference voltage Vr2 which shows reference voltage Vref to drawing 10 (a), in order to shift to the one where the peak voltage Vx1 for outputting control voltage Vc1 is lower, gain is set to 0dB by vin2 also with input signal voltage lower than vin1 of a standard. Therefore, the AGC property of automatic-gain-control equipment can be changed by changing the reference voltage Vref inputted into the direct-current-amplification circuit 3.

[0009] Next, the conventional automatic-gain-control equipment for voice is explained, referring to a drawing.

[0010] Drawing 13 is the circuit diagram of the conventional automatic-gain-control equipment for voice. In drawing 13 , only the member newly added to the conventional automatic-gain-control equipment shown in drawing 11 is explained. Output voltage is made high and the PNP transistor which will flow through the clamping circuit which will hold 7 on fixed voltage if the output voltage of a minute voltage detector exceeds a predetermined value, and 72 if the output voltage of a minute voltage detector exceeds a predetermined value, the constant voltage power supply 73 decides a clamp voltage value to be, and 8 are rectifying minute voltage detectors as input voltage declines.

[0011] Actuation of the automatic-gain-control equipment for voice constituted as mentioned above is explained based on a drawing below.

[0012] Drawing 14 is drawing showing the AGC property of the conventional automatic-gain-control equipment for voice. Drawing 14 (a) is the correlation diagram of the input signal voltage of the conventional automatic-gain-control equipment for voice, and control voltage Vc. Drawing 14 (b) is the correlation diagram of the input signal voltage of conventional automatic-gain-control equipment, and output signal voltage. The output voltage of the rectifier circuit 21 which shows L1 to drawing 13 in drawing 14 (a), The output voltage of the minute voltage detector 8 which shows L2 to drawing 13 , the output voltage of the clamping circuit 7 which shows L3 to drawing 13 , The input signal voltage from which vin1 serves as 0dB gain in reference voltage Vr 1:00 shown in drawing 10 , The input signal voltage to which the output voltage of the minute voltage detector 8 and rectifier circuit 21 which show vin5 to drawing 13 becomes equal, It is the control voltage corresponding to the input signal voltage vin1 and vin6 which is the input signal voltage to which the output voltage of the minute voltage detector 8 and clamping circuit 7 which show vin6 to drawing 13 becomes equal, and control voltage [in / in Vc1 / peak voltage Vx 1:00], and serves as 0dB gain. In drawing 14 (b), G0 is the maximum gain and G9 is the minimum gain.

[0013] When input signal voltage is smaller than vin1, gain approaches maximum G0 and is saturated soon. Even when input signal voltage is very small, if there is no minute voltage

detector 8, it will be gain in the greatest state and a noise will increase. When input signal voltage is five or less vin, in order to generate voltage higher than the direct-current-amplification circuit 3 shown in drawing 13 , this minute voltage detector 8 reduces gain, as shown in drawing 14 (b). Moreover, since only in the case of the minute voltage detector 8 gain will become negative if input signal voltage becomes still smaller than vin6, the clamping circuit 7 is formed in order to impress control voltage to Vc1 from which gain is set to 0dB compulsorily.

[0014] According to the automatic-gain-control equipment for voice which has the aforementioned AGC property, a loud sound is eased, a S/N ratio is improved and a small sound is reproduced clearly.

[0015]

[Problem(s) to be Solved by the Invention] However, said conventional automatic-gain-control equipment Since modification of gain and the AGC turning-on-and-off function by the adjustable function of reference voltage are separated, The 1st trouble that it must control by two or more terminals, and the 2nd trouble that gain at the time of a minute input cannot hold to constant value to change of an AGC property when reference voltage is made adjustable, It had the 3rd trouble that the AGC property by the input signal level of arbitration can be set up freely, or cannot be memorized, and the 4th trouble that an AGC turning-on-and-off change could not carry out to a high speed since time amount is taken to charge the capacity of a low pass filter.

[0016] This invention solves said conventional trouble and it makes that modification of an AGC property and the AGC turning-on-and-off change by correction of reference voltage enable it to control easily into the 1st purpose. It makes making it the minimum gain of an AGC property become fixed into the 2nd purpose, sets it as the 3rd purpose that it can be made to perform a setup and storage of an AGC property, and sets it as the 4th purpose that an AGC turning-on-and-off change is made to be made to a high speed further.

[0017]

[Means for Solving the Problem] An adjustable gain amplifying circuit which invention of claim 1 attains said 1st purpose, responds to gain controlled by control voltage in automatic-gain-control equipment, and amplifies or decreases an input signal, A rectifier circuit which rectifies an output signal of this adjustable gain amplifying circuit, and a hold circuit which outputs peak voltage of rectification voltage rectified by this rectifier circuit, A reference voltage circuit which outputs reference voltage which changes based on foreign voltage, and a direct-current-amplification circuit which outputs said control voltage according to difference of said peak voltage and said reference voltage, It considers as a configuration equipped with a change circuit which changes an output signal and said input signal of said adjustable gain amplifying circuit based on said reference voltage.

[0018] Since a reference voltage circuit consists of a resistance partial pressure circuit and armature-voltage control switches, such as an MOS transistor, by the aforementioned configuration, one terminal can perform modification of an AGC property and an AGC turning-on-and-off change by correction of reference voltage.

[0019] Invention of claim 2 adds a configuration further equipped with a low pass filter excluding a high frequency component of direct current voltage from said control voltage outputted to a configuration of claim 1 by said direct-current-amplification circuit.

[0020] In order that a low pass filter may remove a high frequency component of control voltage which controls an adjustable gain amplifying circuit by the aforementioned configuration, actuation of an adjustable gain amplifying circuit is stabilized.

[0021] An adjustable gain amplifying circuit which invention of claim 3 attains said 1st purpose, responds to gain controlled by control voltage in automatic-gain-control equipment, and amplifies or decreases an input signal, A rectifier circuit which rectifies an output signal of this adjustable gain amplifying circuit, and a low pass filter which outputs effective voltage of rectification voltage rectified by this rectifier circuit, A reference voltage circuit which outputs reference voltage which changes based on foreign voltage, and a direct-current-amplification circuit where said control voltage is outputted according to difference of said

effective voltage and said reference voltage, It considers as a configuration equipped with a change circuit which changes an output signal and said input signal of said adjustable gain amplifying circuit based on said reference voltage.
[0022] Since a reference voltage circuit consists of a resistance partial pressure circuit and armature-voltage control switches, such as an MOS transistor, by the aforementioned configuration, one terminal can perform modification of an AGC property and an AGC turning-on-and-off change by correction of reference voltage.
[0023] Furthermore, since a low pass filter serves as a hold circuit, it can reduce an element number.
[0024] An adjustable gain amplifying circuit which invention of claim 4 attains said 2nd purpose, responds to gain controlled by control voltage in automatic-gain-control equipment, and amplifies or decreases an input signal, A rectifier circuit which rectifies an output signal of this adjustable gain amplifying circuit, and outputs the 1st rectification voltage, A minute voltage detector which rectifies while making height of voltage of an input signal of said adjustable gain amplifying circuit into reverse, and outputs the 2nd rectification voltage, A clamping circuit which controls the 2nd rectification voltage outputted from this minute voltage detector below to a predetermined value according to a value of said reference voltage, Of the 2nd rectification voltage which was outputted from the 1st rectification voltage and said minute voltage detector outputted from said rectifier circuit, and was controlled by said clamping circuit, either A hold circuit which outputs peak voltage of rectification voltage of the higher one, It considers as a configuration equipped with a reference voltage circuit which supplies suitable reference voltage, and a direct-current-amplification circuit which outputs said control voltage according to difference of peak voltage outputted from said hold circuit, and said reference voltage.
[0025] Since a clamping circuit changes voltage which clamps output voltage of a minute voltage detector by the aforementioned configuration according to a value of reference voltage, when a minute signal is inputted, it can amend so that AGC gain may be set to 0dB.
[0026] Invention of claim 5 adds a configuration further equipped with a low pass filter excluding a high frequency component of direct current voltage from said control voltage outputted to a configuration of claim 4 by said direct-current-amplification circuit.
[0027] In order that a low pass filter may remove a high frequency component of control voltage which controls an adjustable gain amplifying circuit by the aforementioned configuration, actuation of an adjustable gain amplifying circuit is stabilized.
[0028] Invention of claim 6 adds a configuration which has a direct-current-amplification circuit where said clamping circuit amplifies said reference voltage to claim 4 or a configuration of 5.
[0029] By the aforementioned configuration, since a clamping circuit has a direct-current-amplification circuit, it can generate suitable clamp voltage.
[0030] An adjustable gain amplifying circuit which invention of claim 7 attains said 2nd purpose, responds to gain controlled by control voltage in automatic-gain-control equipment, and amplifies or decreases an input signal, A rectifier circuit which rectifies an output signal of this adjustable gain amplifying circuit, and outputs the 1st rectification voltage, A minute voltage detector which rectifies while making height of voltage of an input signal of said adjustable gain amplifying circuit into reverse, and outputs the 2nd rectification voltage, A clamping circuit which controls the 2nd rectification voltage outputted from this minute voltage detector below to a predetermined value according to a value of said reference voltage, Of the 2nd rectification voltage which was outputted from the 1st rectification voltage and said minute voltage detector outputted from said rectifier circuit, and was controlled by said clamping circuit, either A low pass filter which outputs effective voltage of rectification voltage of the higher one, It considers as a configuration equipped with a reference voltage circuit which supplies suitable reference voltage, and a direct-current-amplification circuit which outputs said control voltage according to difference of effective voltage outputted from said low pass filter, and said reference voltage.
[0031] Since a clamping circuit changes voltage which clamps output voltage of a minute

voltage detector according to a value of reference voltage by the aforementioned configuration, when a minute signal is inputted, it can amend so that AGC gain may be set to 0dB.
[0032] Furthermore, since a low pass filter serves as a hold circuit, it can reduce an element number.
[0033] As for said clamping circuit, invention of claim 8 adds a configuration in which it has a direct-current-amplification circuit which amplifies said reference voltage to a configuration of claim 7.
[0034] By the aforementioned configuration, since a clamping circuit has a direct-current-amplification circuit, it can generate suitable clamp voltage.
[0035] An adjustable gain amplifying circuit which invention of claim 9 attains said 3rd purpose, responds to gain controlled by control voltage in automatic-gain-control equipment, and amplifies or decreases an input signal, A change circuit which changes and outputs an input signal and an output signal of said adjustable gain amplifying circuit, A rectifier circuit which rectifies an output signal of this change circuit, and a keying circuit which open and close rectification voltage rectified by this rectifier circuit, A hold circuit which outputs peak voltage of said rectification voltage through this keying circuit, An analog-to-digital-conversion circuit which changes said peak voltage into a digital signal, A store circuit which memorizes output data of this analog-to-digital-conversion circuit, It considers as a configuration equipped with a digital to analog circuit which changes into an analog signal data by which reading appearance was carried out from this store circuit, and a direct-current-amplification circuit which outputs said control voltage according to difference of said peak voltage and output voltage of said digital to analog circuit.
[0036] Since an analog-to-digital-conversion circuit digitizes peak voltage outputted by hold circuit, a store circuit memorizes digitized peak voltage, peak voltage which a digital to analog circuit was digitized and was memorized is returned to an analog and reference voltage is generated by the aforementioned configuration, the set point of reference voltage can be memorized at any time, and can be reproduced again.
[0037] Invention of claim 10 adds a configuration further equipped with a charge circuit which charges output voltage of said digital to analog circuit in said hold circuit, while said 4th purpose is attained and said change circuit is outputting said input signal to a configuration of claim 9.
[0038] While an adjustable gain amplifying circuit is not operating by the aforementioned configuration, since a charge circuit charges, a hold circuit will be started shortly after an adjustable gain amplifying circuit begins to operate.
[0039] Invention of claim 11 adds a configuration further equipped with a low pass filter excluding a high frequency component of direct current voltage from said control voltage outputted to claim 9 or a configuration of 10 by said direct-current-amplification circuit.
[0040] In order that a low pass filter may remove a high frequency component of control voltage which controls an adjustable gain amplifying circuit by the aforementioned configuration, actuation of an adjustable gain amplifying circuit is stabilized.
[0041] Invention of claim 12 considers said store circuit as a configuration which is nonvolatile memory in a configuration of any 1 term of claims 9-11.
[0042] Invention of claim 13 considers said store circuit as a configuration which consists of a backup circuit for holding the contents of volatile memory and this volatile memory in a configuration of any 1 term of claims 9-11.
[0043]
[Embodiment of the Invention] Hereafter, the 1st operation gestalt of this invention is explained based on a drawing. Drawing 1 is the block diagram of the automatic-gain-control equipment concerning the 1st operation gestalt of this invention. Drawing 2 is the circuit diagram of the automatic-gain-control equipment concerning the 1st operation gestalt of this invention. In drawing 1 and 2, explanation is omitted by giving the same sign to the same member as the block diagram of the conventional automatic-gain-control equipment shown in drawing 11 . In drawing 1 and drawing 2 , the reference voltage circuit which generates the

reference voltage Vref for 5 to generate control voltage Vc by difference with peak voltage Vx, the change circuit which changes the condition that 6 does not pass with the condition of passing along the adjustable gain amplifying circuit 1, and Vctl are foreign voltage which is impressed to the reference voltage circuit 5 and controls the change circuit 6. In drawing 2 , the n channel MOS transistor by which 52 controls the change circuit 6, and 62 are controlled by the reference voltage Vref generated by the reference voltage circuit 5 and the change voltage Vsw of the change circuit 6, reference voltage Vref changes them, when higher than voltage Vsw, voltage "H" is outputted, and in the case of others, it is the voltage comparator circuit which outputs voltage "L."

[0044] The feature of the 1st operation gestalt shown in drawing 1 is the ability to perform modification of an AGC property and the AGC turning-on-and-off change by making reference voltage Vref adjustable with one external terminal.

[0045] Change actuation of the automatic-gain-control equipment constituted as mentioned above is explained below.

[0046] As foreign voltage Vctl which performs an AGC turning-on-and-off change, voltage "H" or voltage "L" is inputted in digital one by control of the microcomputer from the outside of for example, automatic-gain-control equipment etc.

[0047] First, when foreign voltage Vctl is "L", since the n channel MOS transistor 52 is intercepted, reference voltage Vref becomes the value calculated by formula VccxR2/(R1+R2), and it changes the value of the 1st resistor R1 or the 2nd resistor R2, and can change reference voltage Vref. Moreover, if it changes so that it changes to reference voltage Vref by the voltage comparator circuit 62, and voltage Vsw may be compared, reference voltage Vref may change and it may become higher than voltage Vsw, and voltage Vsw is defined, since the voltage comparator circuit 62 outputs voltage "H", input terminal 61B of the change buffer circuit 61 with a control terminal will be chosen, and the output signal from automatic-gain-control equipment will be outputted.

[0048] Next, since the n channel MOS transistor 52 flows when foreign voltage Vctl is "H", it becomes lower [reference voltage Vref] than the change voltage Vsw and the output of the voltage comparator circuit 62 serves as voltage "L", input terminal 61A is chosen and, as for the change buffer circuit 61 with a control terminal, the direct output of the input signal is carried out.

[0049] As a feature of this operation gestalt, one terminal can perform a setup and AGC turning-on-and-off function of an AGC property by control of reference voltage Vref. What is necessary is just to let foreign voltage Vctl or reference voltage Vref be an external terminal, in case you IC-ize this automatic-gain-control equipment.

[0050] In addition, since the reference voltage circuit 5 should just be circuitry which can change and control the voltage below the change voltage Vsw, and the direct current voltage beyond it, a digital to analog circuit is controlled by the microcomputer, for example, or two or more direct-current-voltage Rhine is changed with a switch, and an equivalent effect is acquired [**** / supplying reference voltage Vref] even if it is the method which has replaced the n channel MOS transistor 52 with the npn bipolar transistor or the electromagnetic relay enough, and carries out it. Moreover, although reference voltage Vref changed in the above, and it explained, having assumed that the adjustable gain amplifying circuit 1 became off when lower than voltage Vsw, it is clearly possible to also make it operate so that reference voltage Vref changes, and the adjustable gain amplifying circuit 1 may become off with a polar combination of the n channel MOS transistor 52, the voltage comparator circuit 62, and the change buffer circuit 61, when higher than voltage Vsw.

[0051] Hereafter, the 2nd operation gestalt of this invention is explained based on a drawing. Drawing 3 is the circuit diagram of the automatic-gain-control equipment concerning the 2nd operation gestalt of this invention. In drawing 3 , the same sign is given to the same member as the circuit diagram of the automatic-gain-control equipment concerning the 1st operation gestalt shown in drawing 2 , and explanation is omitted. In drawing 3 , the low pass filter 4 is connected to the serial between the rectifier circuit 21 and the direct-current-amplification circuit 3, and the rectification voltage outputted by the rectifier circuit 21 is inputted, and

outputs the effective voltage Vx2 of the inputted rectification voltage. The direct-current-amplification circuit 3 amplifies the difference of the reference voltage Vref of the reference voltage circuit 5, and effective voltage Vx2, and generates control voltage Vc. In addition, this operation gestalt adds the adjustable gain amplifying circuit 1, a rectifier circuit 2, a low pass filter 4, and the change circuit 6, and can respond also to the configuration which can control two or more adjustable gain amplifying circuits 1 where the highest voltage or the highest average is inputted among the activation voltage Vx2 of many inputs in the direct-current-amplification circuit 4.

[0052] As a feature of this operation gestalt, one terminal can perform a setup and AGC turning-on-and-off function of an AGC property by control of reference voltage Vref like the 1st operation gestalt.

[0053] Furthermore, since the hold circuit 22 is made to serve a double purpose with the low pass filter 4, the configuration of equipment becomes easy.

[0054] Hereafter, the 3rd operation gestalt of this invention is explained based on a drawing. Drawing 4 is the block diagram of the automatic-gain-control equipment concerning the 3rd operation gestalt of this invention. Drawing 5 is the circuit diagram of the automatic-gain-control equipment concerning the 3rd operation gestalt of this invention. In drawing 4 and drawing 5 , explanation is omitted by giving the same sign to the same member as the circuit diagram of the conventional automatic-gain-control equipment for voice shown in drawing 13 . In drawing 4 , since the adjustable gain amplifying circuit 1 has the gain property of drawing 12 (a), when an input signal is minute voltage, as shown in the property of L1 of drawing 14 (a), the output of the peak detector 2 descends. Moreover, the output voltage of the minute voltage detector 8 where high voltage is outputted is combined with the output voltage of a rectifier circuit 21 as are shown in the property of L2 of drawing 14 (a) and input signal voltage becomes lower than predetermined voltage, and the peak voltage Vx which is the output voltage of a hold circuit 22 turns into output voltage of the higher one of said two output voltage. The control voltage Vc through the direct-current-voltage circuit 3 and a low pass filter 4 rises as this peak voltage Vx becomes high, and the gain of the adjustable gain amplifying circuit 1 is made to fall. Furthermore, in order to prevent the gain below a predetermined input level decreasing too much, the output voltage of the minute voltage detector 8 is restricted by the clamping circuit 7 as shown in the property of L3 of drawing 14 (a). Next, if reference voltage Vref is changed and an AGC property is changed, clamp voltage changes according to reference voltage Vref, and a clamping circuit 7 can be amended so that the minimum gain at the time of a predetermined minute signal input may become fixed according to change of reference voltage Vref.

[0055] When a minute signal is inputted, in order to prevent deterioration of the S/N ratio by the gain of an AGC property increasing as a feature of the 3rd operation gestalt shown in drawing 4 , the minute voltage detector 8 and a clamping circuit 7 are formed, and the gain of an AGC property is decreased.

[0056] Furthermore, since reference voltage Vref is changed, an AGC property is changed and clamp voltage is changed according to reference voltage Vref, it can amend so that the minimum gain of the AGC property at the time of a minute signal input may become fixed.

[0057] In drawing 5 , 71 is a direct-current-amplification circuit for a clamp which amplifies reference voltage Vref and generates the voltage for a clamp. A clamping circuit 7 is the configuration of consisting of a direct-current-amplification circuit 71 for a clamp where reference voltage Vref is inputted, and PNP transistor 72 by which the amplified reference voltage Vref is impressed to a base electrode.

[0058] Actuation of the automatic-gain-control equipment constituted as mentioned above is explained below based on a drawing. Drawing 10 is AGC property drawing of the automatic-gain-control equipment concerning the 3rd operation gestalt of this invention. Drawing 10 (a) is a correlation diagram with the voltage of the input signal with which the reference voltage Vref and gain of the automatic-gain-control equipment concerning the 3rd operation gestalt of this invention are set to 0dB. Drawing 10 (b) is the correlation diagram of the voltage of the input signal of automatic-gain-control equipment and the voltage of an output signal

concerning the 3rd operation gestalt of this invention. As for Vr1, in drawing 10 (a), standard reference voltage, reference voltage with Vr2 [lower than a standard], reference voltage with Vr3 [higher than a standard], the input signal voltage from which vin1 becomes the 0dB gain in reference voltage Vr1, the input signal voltage from which vin2 becomes the 0dB gain in reference voltage Vr2, and vin3 are the input signal voltage used as the 0dB gain in reference voltage Vr3. In drawing 10 (b), vin1, vin2, and vin3 are the same as that of the above. vin5 of the input signal voltage to which the output voltage of the minute voltage detector 8 and a rectifier circuit 21 becomes equal, the input signal voltage to which, as for vin6, the output voltage of the minute voltage detector 8 and a clamping circuit 7 becomes equal, and G0 is [the maximum gain and G9] the minimum gains.

[0059] First, in the case of the reference voltage Vr1 of the standard which reference voltage Vref shows to drawing 10 (a) As opposed to a bigger input signal than the input signal voltage Vin5 shown in drawing 14 (a) the output voltage of a rectifier circuit 21 Since it becomes larger than the output voltage of the minute voltage detector 8 and this output voltage is outputted and combined by the emitter follower, since an output transistor is intercepted, the low output voltage of the minute voltage detector 8 The output of the rectifier circuit 2 where voltage is high is outputted as peak voltage Vx through a hold circuit 22.

[0060] Next, since it becomes higher [the output of the minute voltage detector 8] than the output of a rectifier circuit 21 to an input signal with input signal voltage lower than the input signal voltage Vin5 shown in drawing 14 (a) and is outputted as peak voltage Vx through a hold circuit 22, the output voltage of the minute voltage detector 8 becomes high with the fall of input signal voltage. Therefore, peak voltage Vx and control voltage Vc rise, and as shown in drawing 14 (b), gain declines. If the output voltage of a clamping circuit 7 is added to the output voltage of the minute voltage detector 8, the excessive output voltage of the minute voltage detector 8 will be clamped by the output voltage of a clamping circuit 7. Therefore, when the voltage of an input signal is lower than the input signal voltage Vin6 shown in drawing 14 (a), even if a minute signal level is inputted, gain can be set to 0dB, and it cannot be based on the amplitude of an input signal, but an AGC property can be made regularity.

[0061] Next, although the gain of an AGC property increases since the control voltage Vc through the direct-current-amplification circuit 3 and a low pass filter 4 will become low if input signal voltage is set to vin1 when setting it as Vr3 which shows reference voltage Vref to drawing 10 (a) higher than a standard, supposing clamp voltage is the same value as the above, the gain at the time of a minute input will also increase. Since this phenomenon is prevented, the minimum gain at the time of a with a predetermined voltage [vin] of six or less minute signal input can be maintained at the 0dB same gain as the case where Vref is the standard reference voltage Vr1, by setting up clamp voltage through the direct-current-amplification circuit 71 for a clamp and the pnp bipolar transistor 72 which make reference voltage Vref an input value more highly than the case of the standard reference voltage Vr1.

[0062] Next, actuation and voltage change of each part in the case of setting reference voltage Vref as Vr2 lower than a standard become reverse [the above], and that of here where minimum gain is maintained at the 0dB same gain as the case of a standard are possible by setting up clamp voltage lowness rather than the case of the standard reference voltage Vr1.

[0063] In addition, it can respond also to the configuration which can control two or more adjustable gain amplifying circuits 1 where the highest voltage or the highest average of the peak voltage Vx of many inputs is inputted in the direct-current-amplification circuit 3 by adding the adjustable gain amplifying circuit 1 and the peak detector 2.

[0064] Hereafter, the 4th operation gestalt of this invention is explained based on a drawing. Drawing 6 is the circuit diagram of the automatic-gain-control equipment concerning the 4th operation gestalt of this invention. In drawing 6 , explanation is omitted by giving the same sign to the same member as the circuit diagram of the automatic-gain-control equipment concerning the operation gestalt of this invention 3rd shown in drawing 5 . In drawing 6 , if only a different point from the 3rd operation gestalt is explained, like the 2nd operation gestalt, the low pass filter 4 is connected to the serial between the rectifier circuit 21 and the

direct-current-amplification circuit 3, and the rectification voltage outputted by the rectifier circuit 21 will be inputted, and will output the effective voltage Vx2 of the inputted rectification voltage. The direct-current-amplification circuit 3 is a configuration which carries out direct current amplification of the difference of effective voltage Vx2 and reference voltage Vref, and generates control voltage Vc.
[0065] As a feature of this operation gestalt, even if it changes reference voltage Vref, when both clamp voltage changes, the minimum gain at the time of the minute signal input below a predetermined value can be maintained at constant value.
[0066] Furthermore, since the hold circuit 22 is made to serve a double purpose with the low pass filter 4, the configuration of equipment becomes easy.
[0067] In addition, it can respond also to the configuration which the highest voltage or the highest average of the effective voltage Vx2 of many inputs is inputted into the direct-current-amplification circuit 3, and can control two or more adjustable gain amplifying circuits 1 by adding the adjustable gain amplifying circuit 1, a rectifier circuit 21, a low pass filter 4, and the change circuit 6.
[0068] Hereafter, the 5th operation gestalt of this invention is explained based on a drawing. Drawing 7 is the block diagram of the automatic-gain-control equipment concerning the 5th operation gestalt of this invention. Drawing 8 is the circuit diagram of the automatic-gain-control equipment concerning the 5th operation gestalt of this invention. In drawing 7 and drawing 8 , only the member newly added to the automatic-gain-control equipment of the 1st operation gestalt of this invention shown in drawing 1 is explained. The A/D-conversion circuit which digitizes the peak voltage Vx to which 9 is outputted by the hold circuit 22 in drawing 7 and drawing 8 , The store circuit which memorizes the peak voltage Vx with which 10A was digitized by the A/D-conversion circuit 9, The D/A conversion circuit which restores the digitized peak voltage Vx 10B is memorized by semiconductor memory, such as SRAM, and 11 is remembered to be by store circuit 10A to reference voltage Vref, The charge circuit where 12 charges the capacity of a hold circuit 22, the keying circuit where 13 opens and closes a hold circuit 22, The control circuit where 14 controls the A/D-conversion circuit 9, store circuit 10A, the D/A conversion circuit 11, a charge circuit 12, a keying circuit 13, and the change circuit 6, and 15 are the backup circuits for the store circuit for which backup power supplies, such as SRAM, are needed. In addition, when using nonvolatile memory, such as EEPROM, as semiconductor memory 10B, actuation of the automatic-gain-control equipment which becomes unnecessary [the backup circuit 15] and which was constituted as mentioned above is explained below.
[0069] First, supposing it changed by the control circuit 14, the circuit 6 was chosen as input terminal 6A and it has closed the keying circuit 13, peak voltage Vx will be generated through a rectifier circuit 21 and a hold circuit 22, an input signal will be digitized by the A/D-conversion circuit 9, and the digitized data Vx will be memorized by store circuit 10A equipped with the backup circuit 15.
[0070] Next, the data Vx of store circuit 10A is restored by the D/A conversion circuit 11, and the restored voltage is inputted into the direct-current-amplification circuit 4 as reference voltage Vref. It has the relation the input voltage Vx of the A/D-conversion circuit 9 and the output voltage Vref of the D/A conversion circuit 11 are always equal unrelated, and the number of bits is secured so that the quantization error of the A/D-conversion circuit 9 can also be disregarded.
[0071] Next, it changes by the control circuit 14, and a circuit 6 is chosen as input terminal 6B, and an input signal is inputted into the direct-current-amplification circuit 3 through the adjustable gain amplifying circuit 1, a rectifier circuit 21, and a hold circuit 22. When peak voltage Vx and reference voltage Vref are equal, if relation with the gain of peak voltage Vx, reference voltage Vref and Vc, or the adjustable gain amplifying circuit 1 is beforehand defined so that the gain of the adjustable gain amplifying circuit 1 may be set to 0dB to control voltage Vc, gain will be converged on 0dB by the operating characteristic of AGC. In addition, when peak voltage Vx and reference voltage Vref were equal, the relation of the gain of the adjustable gain amplifying circuit 1 was assumed so that the gain of the adjustable gain

amplifying circuit 1 might be set to 0dB to control voltage Vc, but if it determines that the gain of the adjustable gain amplifying circuit 1 serves as NdB (N shows the real number) of arbitration, an AGC property with the gain of NdB by the same standard input signal is realizable by using the same procedure as the above.
[0072] Therefore, it becomes memorizable [reference voltage Vref] and a setup of the AGC property over the input signal of arbitration is still also attained.
[0073] Next, it changes by the control circuit 14, and when a circuit 6 is chosen as input terminal 6A, a keying circuit 13 opens it and it changes into the condition of AGC OFF, charge of the capacity of a hold circuit 22 is performed so that peak voltage Vx may become equal to reference voltage Vref through a charge circuit 12. In order that the output will be in a hi-z state by the control circuit 14 and a charge circuit 12 may close a keying circuit 13 at the same time the change circuit 6 changes from OFF to ON, peak voltage Vx changes to the drive by the rectifier circuit 21 again.
[0074] Since the time amount which charges a hold circuit 22 through a rectifier circuit 21 at the time of the change to the ON from AGC OFF is omissible, automatic-gain-control equipment is stabilized in an instant, and can perform a high-speed change. Since build up time when charge of the hold circuit 22 which occupies the great portion of switching time is completed beforehand, until an AGC property is stabilized can be shortened, the high-speed change to the ON from AGC OFF is realizable. In addition, since the change to the OFF from AGC ON is high-speed enough, the cure is unnecessary.
[0075] Hereafter, the 6th operation gestalt of this invention is explained based on a drawing. Drawing 9 is the circuit diagram of the automatic-gain-control equipment concerning the 6th operation gestalt of this invention. In drawing 9 , only the member newly added to the automatic-gain-control equipment of the 5th operation gestalt of this invention shown in drawing 8 is explained. In drawing 9 , a reference voltage circuit for 16 to set up the gain used as criteria and Vref2 are the 2nd control voltage which sets up the gain used as criteria. The change buffer circuit 61 with a control terminal is the configuration that the 2nd control voltage Vref2 which is the output voltage of the reference voltage circuit 16, and the control voltage Vc which is the output voltage of a low pass filter are inputted, and either the 2nd control voltage Vref2 or the control voltage Vc is inputted into the adjustable gain amplifying circuit 1.
[0076] Actuation of the automatic-gain-control equipment constituted as mentioned above is explained below.
[0077] First, the input terminal of the change buffer circuit 61 is chosen as 61A, and the gain of the adjustable gain control circuit 1 is set as 0dB with the 2nd control voltage Vref2.
[0078] Next, the standard input signal for setting an AGC property as 0dB is inputted, and the peak voltage Vx through a rectifier circuit 21 and a hold circuit 22 is changed into Data Vx by the A/D-conversion circuit 9, and is memorized by semiconductor memory 10B.
[0079] Next, reading appearance of the data Vx is carried out, and reference voltage Vref is generated by the D/A conversion circuit 11. Peak voltage Vx and reference voltage Vref are always equal, and the quantization error accompanying digitization needs to secure a data length so that it may become small enough.
[0080] Next, if the change buffer circuit 61 with a control terminal is chosen as input terminal 61B and said standard input signal is inputted, since peak voltage Vx and reference voltage Vref have equal relation and control voltage Vc and the relation of gain are set that the gain of the adjustable gain control circuit 1 is set to 0dB, the peak voltage Vx through a rectifier circuit 21 and a hold circuit 22 is converged on voltage equal to reference voltage Vref as an operating characteristic of AGC. In addition, it is also possible to carry out the multi-statement of the standard signal, if semiconductor memory 10B with large storage capacity is used, to begin to read timely from the inside, and to change the control characteristic of AGC gain.
[0081] As a feature of this operation gestalt, like the 5th operation gestalt, it becomes memorizable [reference voltage Vref] and a setup of the AGC property over the input signal of arbitration also becomes possible.

[0082] Furthermore, structure becomes easy in order to use the reference voltage circuit 16 with few element numbers compared with a keying circuit 13.
[0083]
[Effect of the Invention] Since modification and the AGC turning-on-and-off function of reference voltage can be realized with one terminal according to the automatic-gain-control equipment concerning invention of claim 1 as explained above, the control which changes reference voltage or changes actuation of automatic-gain-control equipment becomes easy.
[0084] Furthermore, since the number of terminals can be reduced when it IC-izes, reduction of package cost can be aimed at.
[0085] Since according to the automatic-gain-control equipment concerning invention of claim 2 the effect of the automatic-gain-control equipment concerning invention of claim 1 is acquired upwards and actuation of an adjustable gain amplifying circuit is stabilized, an AGC property becomes what was further excellent.
[0086] According to the automatic-gain-control equipment concerning invention of claim 3, since the effect of the automatic-gain-control equipment concerning invention of claim 1 is acquired upwards and an element number becomes fewer, it becomes easy to make equipment.
[0087] Since according to the automatic-gain-control equipment concerning invention of claim 4 it can amend so that AGC gain may be set to 0dB when a minute signal is inputted, the stable AGC property is realizable.
[0088] Since according to the automatic-gain-control equipment concerning invention of claim 5 the effect of the automatic-gain-control equipment concerning invention of claim 4 is acquired upwards and actuation of an adjustable gain amplifying circuit is stabilized, an AGC property becomes what was further excellent.
[0089] Since according to the automatic-gain-control equipment concerning invention of claim 6 the effect of the automatic-gain-control equipment concerning claim 4 or invention of 5 is acquired upwards and suitable clamp voltage can be generated, the AGC property at the time of a minute input becomes what was further excellent.
[0090] According to the automatic-gain-control equipment concerning invention of claim 7, since the effect of the automatic-gain-control equipment concerning invention of claim 4 is acquired upwards and an element number becomes fewer, it becomes easy to make equipment.
[0091] Since according to the automatic-gain-control equipment concerning invention of claim 8 the effect of the automatic-gain-control equipment concerning invention of claim 7 is acquired upwards and suitable clamp voltage can be generated, the AGC property at the time of a minute input becomes what was further excellent.
[0092] Since according to the automatic-gain-control equipment concerning invention of claim 9 the set point of reference voltage can be memorized and it can reproduce, the AGC property according to the purpose of use can be set up.
[0093] Furthermore, when it IC-izes, by programming by the standard wave for example, by IC circuit tester etc., dispersion in a manufacturing process is suppressed like a check row, and a uniform AGC property can be acquired by it.
[0094] Since according to the automatic-gain-control equipment concerning invention of claim 10 the effect of the automatic-gain-control equipment concerning invention of claim 9 is acquired upwards, an adjustable gain amplifying circuit starts and it operates the back, the high-speed change of AGC turning on and off can be performed.
[0095] Since according to the automatic-gain-control equipment concerning invention of claim 11 the effect of the automatic-gain-control equipment concerning claim 9 or invention of 10 is acquired upwards and actuation of an adjustable gain amplifying circuit is stabilized, an AGC property becomes what was further excellent.
[0096] According to the automatic-gain-control equipment concerning invention of claim 12, since it is held, the data memorized even if the effect of the automatic-gain-control equipment concerning invention of any 1 term of claims 9-11 is acquired upwards and the power supply became off can be reset easily.

[0097] Furthermore, since memory is nonvolatile, a backup circuit becomes unnecessary.
[0098] According to the automatic-gain-control equipment concerning invention of claim 13, the effect of the automatic-gain-control equipment concerning invention of any 1 term of claims 9-11 is acquired upwards, and the write-in time amount of the data to a store circuit and the read-out time amount of the data from a store circuit become early.

[Translation done.]

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3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the block diagram of the automatic-gain-control equipment concerning the 1st operation gestalt of this invention.
[Drawing 2] It is the circuit diagram of the automatic-gain-control equipment concerning the 1st operation gestalt of this invention.
[Drawing 3] It is the circuit diagram of the automatic-gain-control equipment concerning the 2nd operation gestalt of this invention.
[Drawing 4] It is the block diagram of the automatic-gain-control equipment concerning the 3rd operation gestalt of this invention.
[Drawing 5] It is the circuit diagram of the automatic-gain-control equipment concerning the 3rd operation gestalt of this invention.
[Drawing 6] It is the circuit diagram of the automatic-gain-control equipment concerning the 4th operation gestalt of this invention.
[Drawing 7] It is the block diagram of the automatic-gain-control equipment concerning the 5th operation gestalt of this invention.
[Drawing 8] It is the circuit diagram of the automatic-gain-control equipment concerning the 5th operation gestalt of this invention.
[Drawing 9] It is the circuit diagram of the automatic-gain-control equipment concerning the 6th operation gestalt of this invention.
[Drawing 10] It is drawing showing the AGC property of the automatic-gain-control equipment concerning the 3rd operation gestalt of this invention, and the 4th operation gestalt. (a) is a correlation diagram with the input signal voltage from which the reference voltage Vref and gain of the automatic-gain-control equipment concerning the 3rd operation gestalt of this invention and the 4th operation gestalt are set to 0dB. (b) is the correlation diagram which expressed the input signal voltage and output signal voltage of the automatic-gain-control equipment concerning the 3rd operation gestalt of this invention, and the 4th operation gestalt as a pair numeric value.
[Drawing 11] It is the circuit diagram of conventional automatic-gain-control equipment.
[Drawing 12] It is drawing showing the AGC property of conventional automatic-gain-control equipment. (a) is the correlation diagram of the control voltage Vc of conventional automatic-gain-control equipment, and gain. (b) is the correlation diagram of the peak voltage Vx of the direct-current-amplification circuit at the time of fixing reference voltage, and control voltage Vc. (c) is the correlation diagram which expressed the conventional input signal voltage and the output signal voltage of automatic-gain-control equipment as a pair numeric value.
[Drawing 13] It is the circuit diagram of the conventional automatic-gain-control equipment for voice.
[Drawing 14] It is drawing showing the AGC property of the conventional automatic-gain-control equipment for voice. (a) is the correlation diagram of the input signal voltage of the conventional automatic-gain-control equipment for voice, and control voltage Vc. (b) is the correlation diagram which expressed the conventional input signal voltage and the output signal voltage of the automatic-gain-control equipment for voice as a pair numeric value.
[Description of Notations]

1 Adjustable Gain Increase Circuit
2 Peak Detector
21 Rectifier Circuit
22 Hold Circuit
3 Direct-Current-Amplification Circuit
4 Low Pass Filter
5 Reference Voltage Circuit
51 Resistance Partial Pressure Circuit
52 N Channel MOS Transistor
R1 The 1st resistor
R2 The 2nd resistor
6 Change Circuit
61 Change Buffer Circuit with Control Terminal
6A Input terminal
6B Input terminal
61A Input terminal
61B Input terminal
62 Voltage Comparator Circuit
Y Output terminal
7 Clamping Circuit
71 Direct-Current-Amplification Circuit for Clamp
72 PNP Transistor
73 Constant Voltage Power Supply
8 Minute Voltage Detector
9 A/D-Conversion Circuit
10A Store circuit
10B Semiconductor memory
11 D/A Conversion Circuit
12 Charge Circuit
13 Keying Circuit
14 Control Circuit
15 Backup Circuit
16 Reference Voltage Circuit
Vc Control voltage
Vx Peak voltage
Vx2 Effective voltage
Vref Reference voltage
Vref2 Control voltage
Vctl Foreign voltage
Vcc Supply voltage
Vsw Change voltage
Vr1 Standard reference voltage
Vr2 Reference voltage lower than a standard
Vr3 Reference voltage higher than a standard
vin0 The minimum value from which AGC of input signal voltage becomes effective
vin1 Input signal voltage used as the 0dB gain in reference voltage Vr 1:00
vin2 Input signal voltage used as the 0dB gain in reference voltage Vr 2:00
vin3 Input signal voltage used as the 0dB gain in reference voltage Vr 3:00
vin5 Input signal voltage to which the output voltage of the minute voltage detector 8 and a rectifier circuit 21 becomes equal
vin6 Input signal voltage to which the output voltage of the minute voltage detector 8 and a clamping circuit 7 becomes equal
vin9 Maximum from which AGC of input signal voltage becomes effective
G0 The maximum gain

G9 The minimum gain
Vx1 Peak voltage used as the 0dB gain in reference voltage Vr 1:00
Vc1 Control voltage in peak voltage Vx 1:00
L1 Output voltage of a rectifier circuit 21
L2 Output voltage of the minute voltage detector 8
L3 Output voltage of a clamping circuit 7

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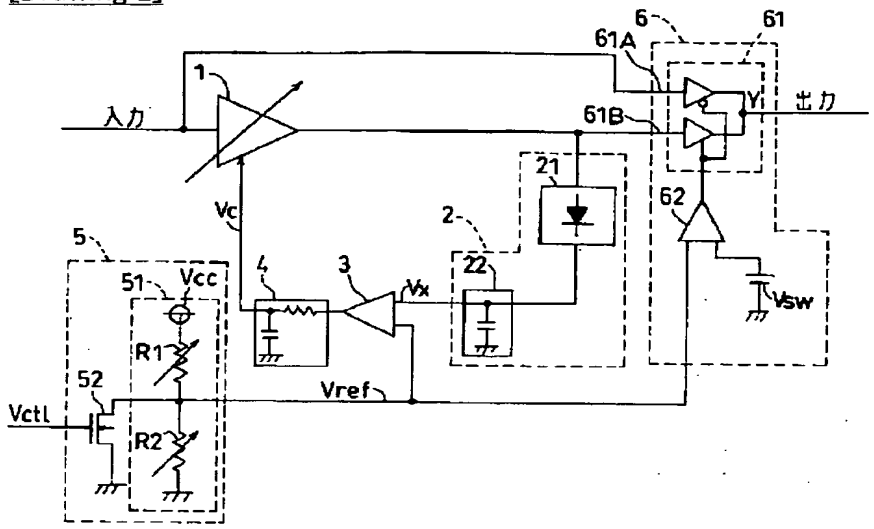
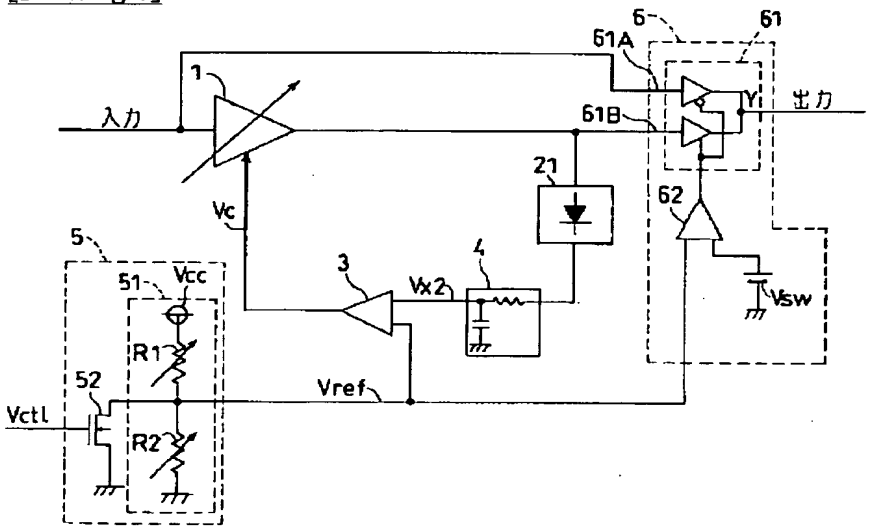
DRAWINGS

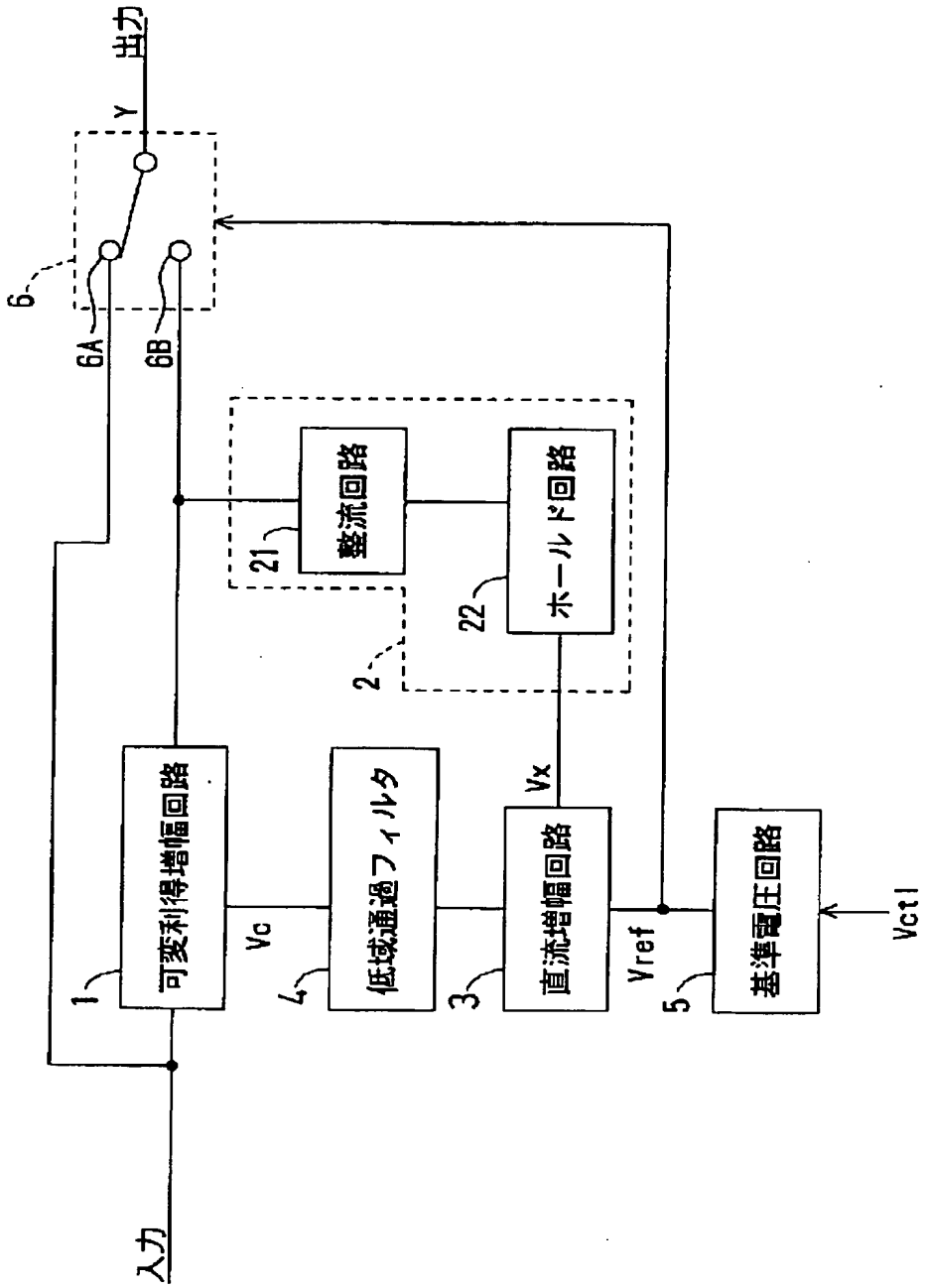
[Drawing 2]



[Drawing 3]



[Drawing 1]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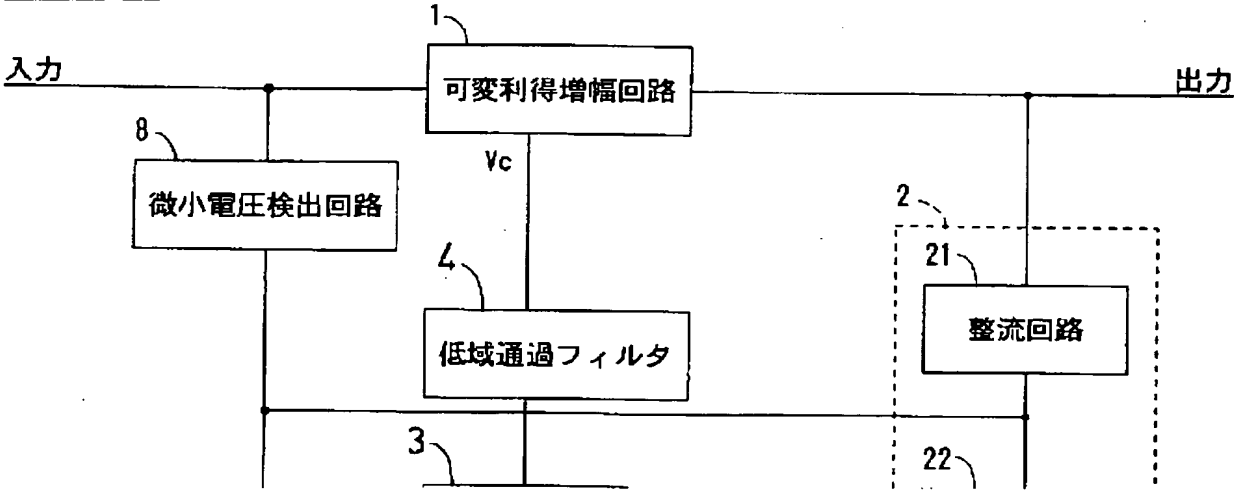
Vref
基準電圧回路
5
Vctl
入力

[Drawing 4]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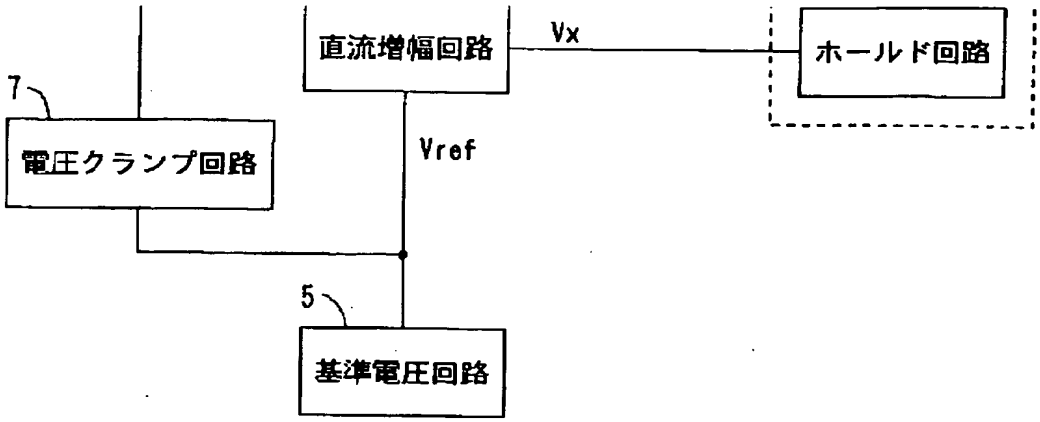
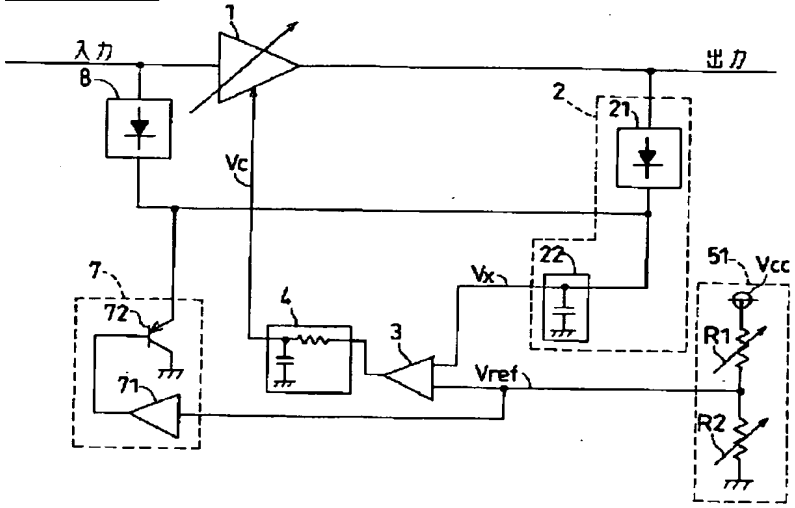


[Drawing 5]



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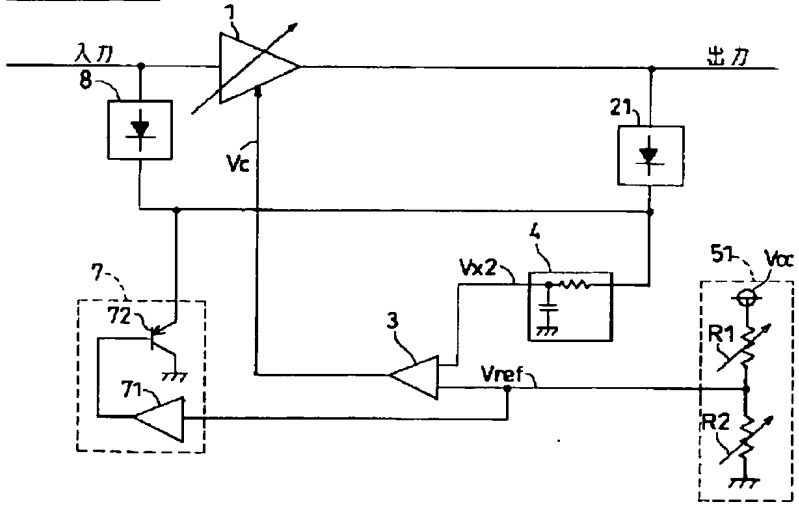
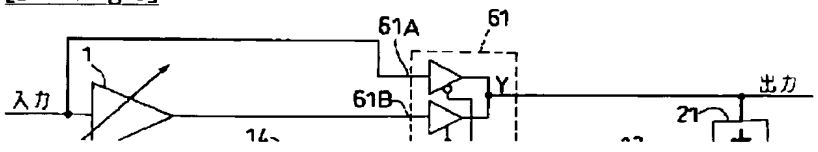
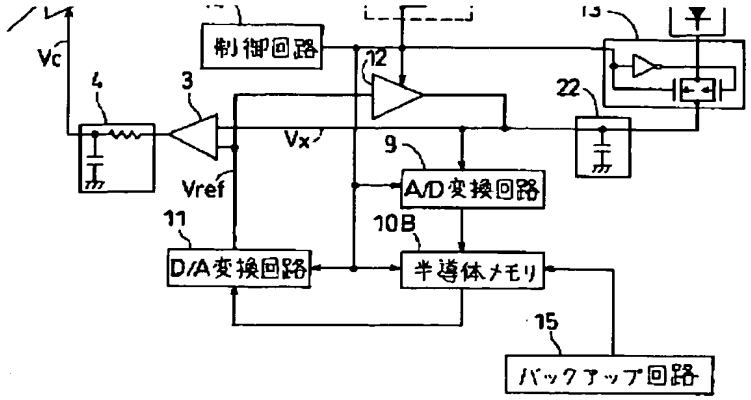
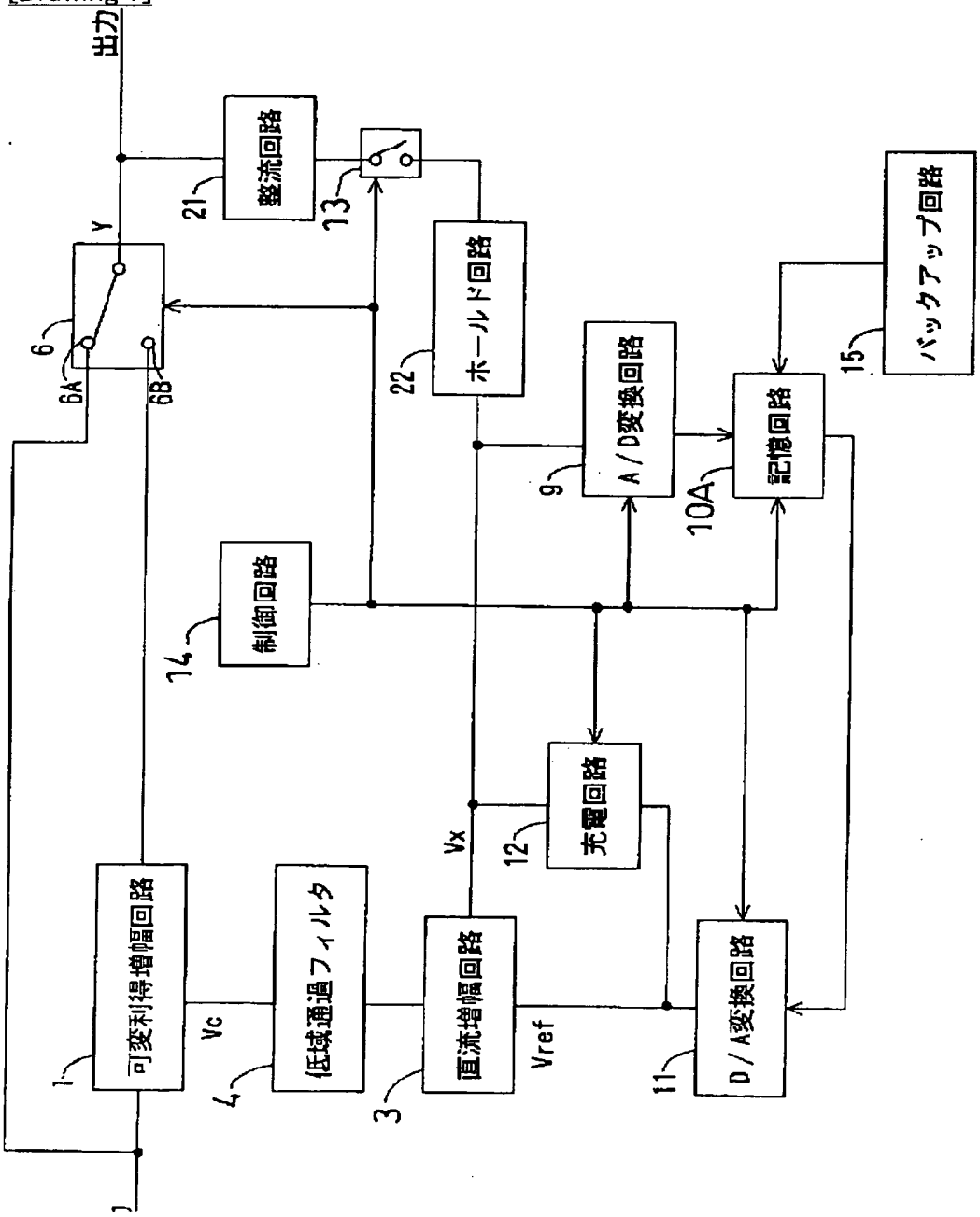


[Drawing 8]




制御回路
Vc
4
3
12
22
Vx
9
A/D変換回路
Vref
11
10B
D/A変換回路
半導体メモリ
15
バックアップ回路

[Drawing 7]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D/A変換回路
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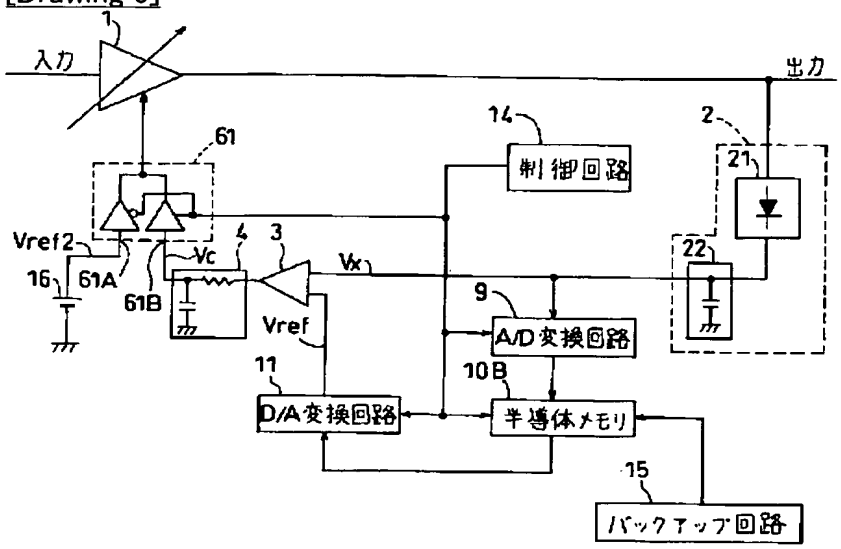
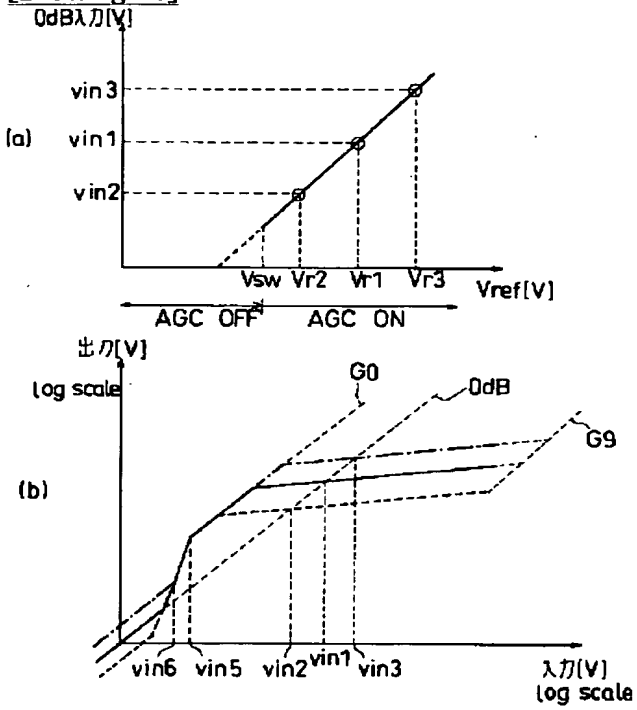
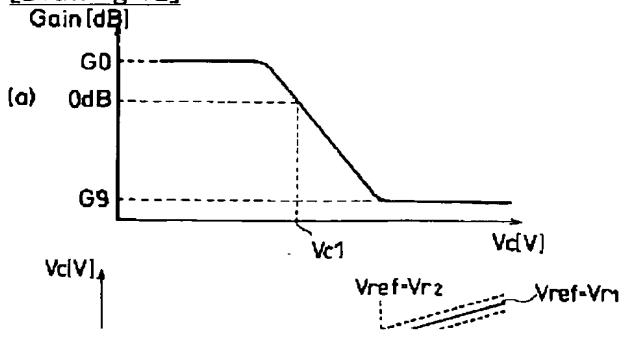
[Drawing 9]

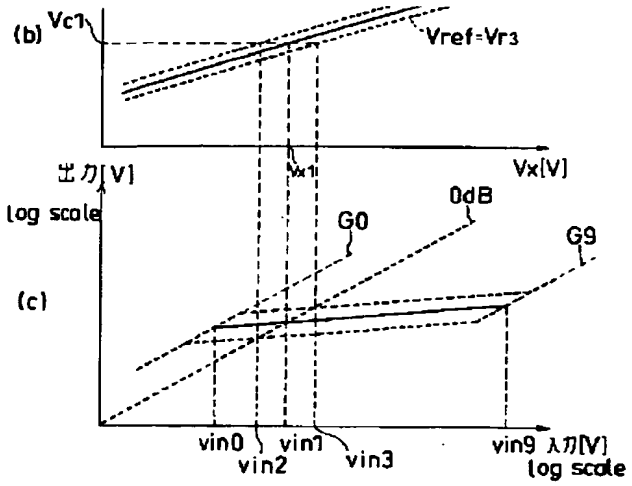


[Drawing 10]

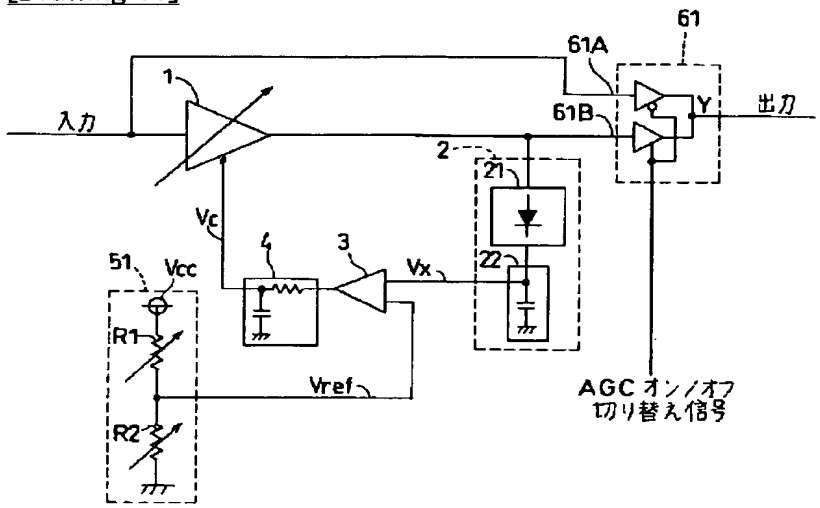


[Drawing 12]

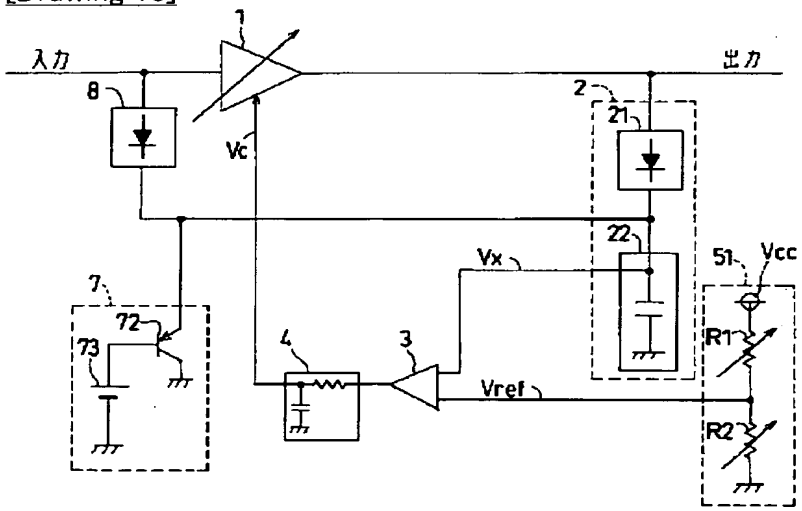




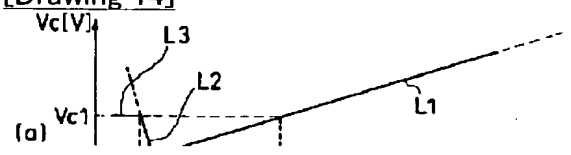
[Drawing 11]

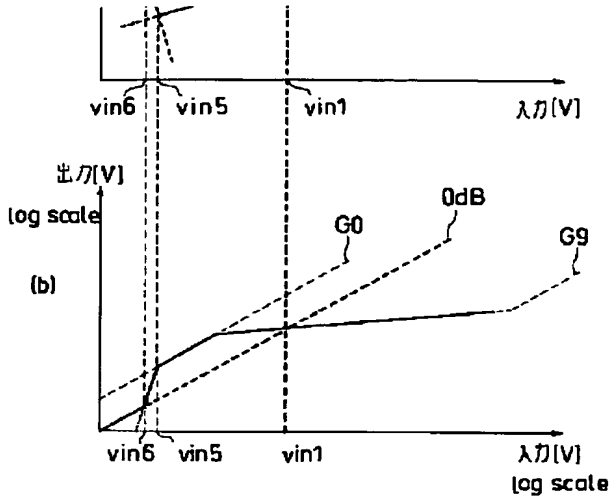


[Drawing 13]



[Drawing 14]





[Translation done.]